Run 15 RHIC Machine/Experiments Meeting

17 Mar 2015

Agenda:

- **Run 15 Schedule** (Pile)
- **Other**

Run 15 plan based on 22 weeks cryo operation

and Fischer et.al. RHIC Collider Projections (FY 2013 – FY 2022), 21 Sep 2014

- 20 Jan, Begin cool-down to 4.5K
- 21 Jan (morning), Blue cold
- 22 Jan (evening), Yellow cold
- 23 Jan (after midnight), Beam in Blue
- 7 Feb, First overnight stores for experiments
- 10 Feb (3 days early) store 18662, Begin 9 week **√s=200 GeV pp** physics run

- ***14-18(?) Mar, Power Dip downtime***

- ***today, 17 Mar…***

- 17 April (Fri), End 9 week √s=200 GeV pp physics run – ***note this is a Friday!***

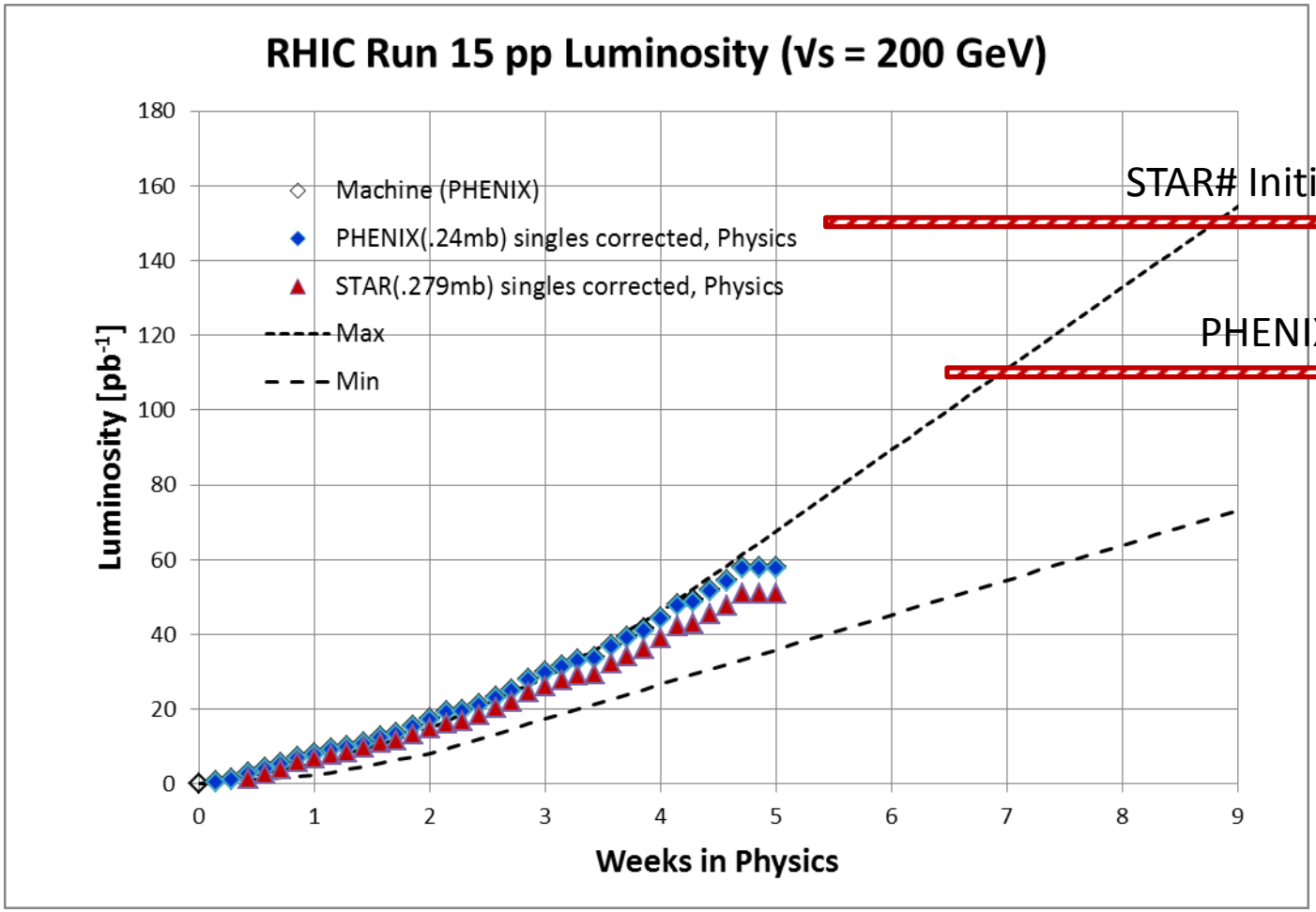
- 28 April (Tue), Begin 5 week **√s=200 GeV/n pAu** physics run
- 2 June (Tue), End 5 week √s=200 GeV/n pAu physics run

- 5 June (Fri), Begin 2 week **√s=200 GeV/n pAl** physics run
- 19 June (Fri), End 2 week √s=200 GeV/n pAl physics run

- 19 June (Fri), begin cryo warm-up
- 23 June, cryo warm-up complete, ***22.0 cryo weeks*** of operation

See http://www.rhichome.bnl.gov/AP/Spin2015/ for the Run Coordinator's detailed plan

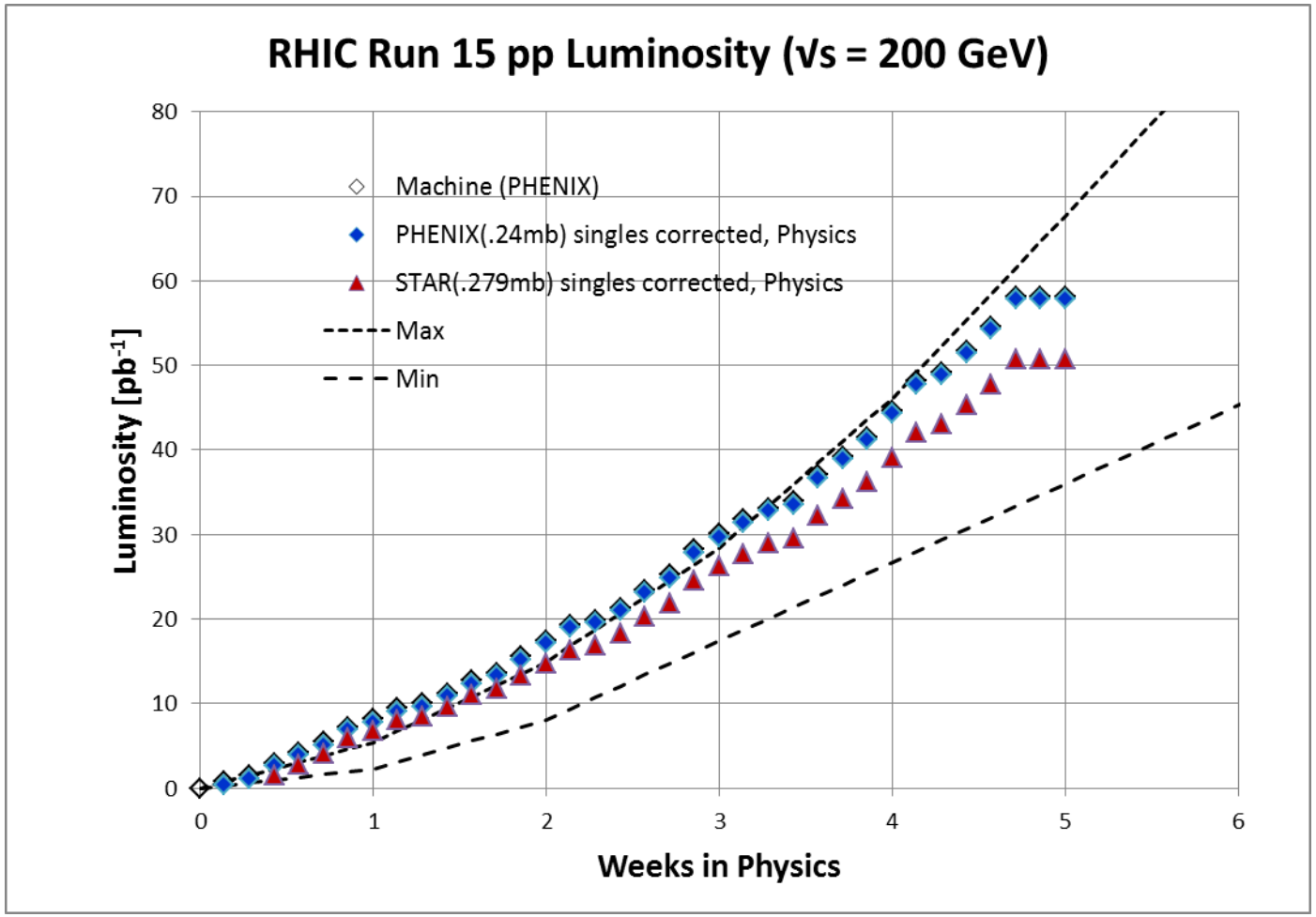
Thru fill 18780, 14 Mar



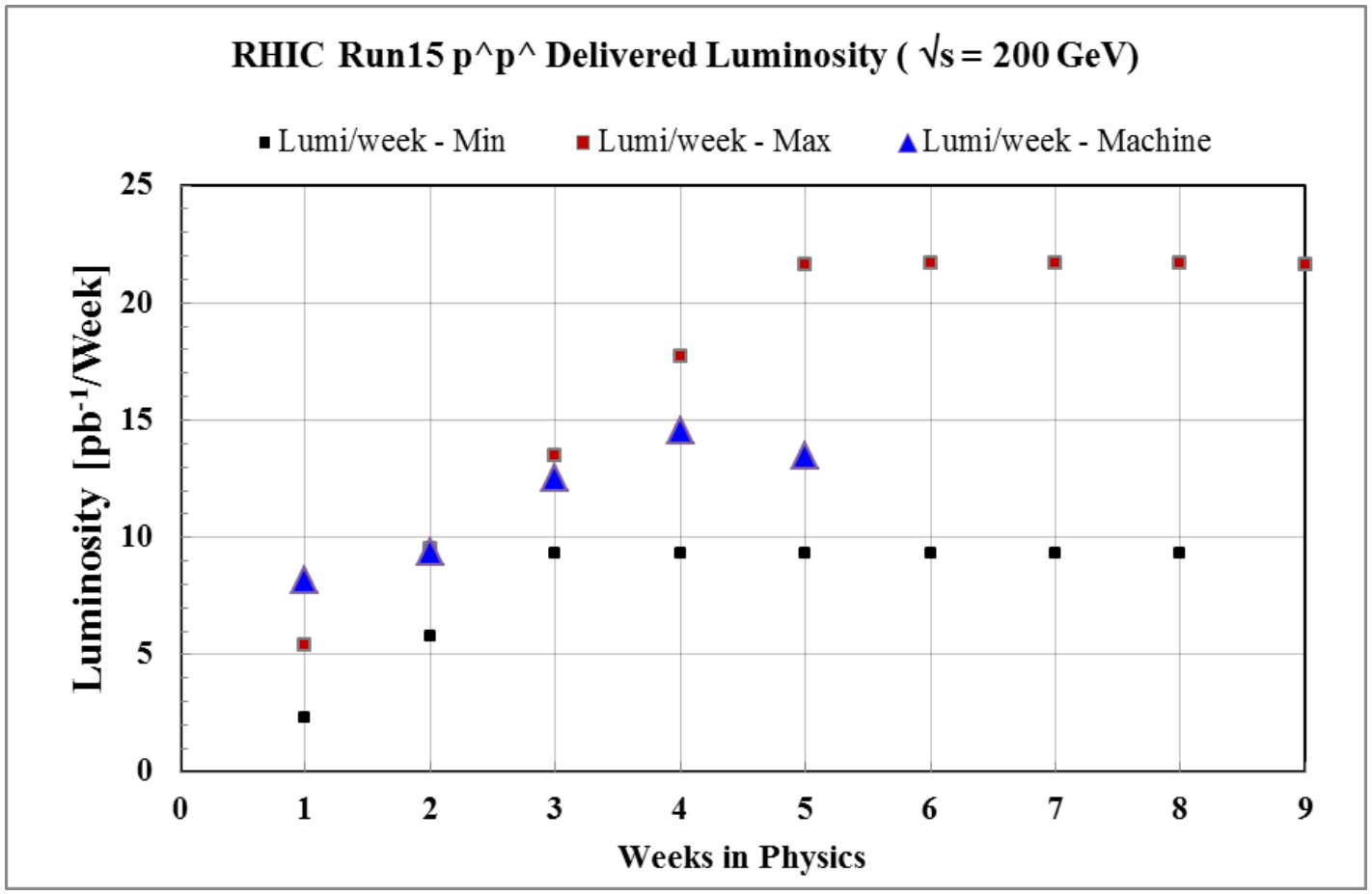
*Based on beam use request

Based on beam use request with 12 weeks physics

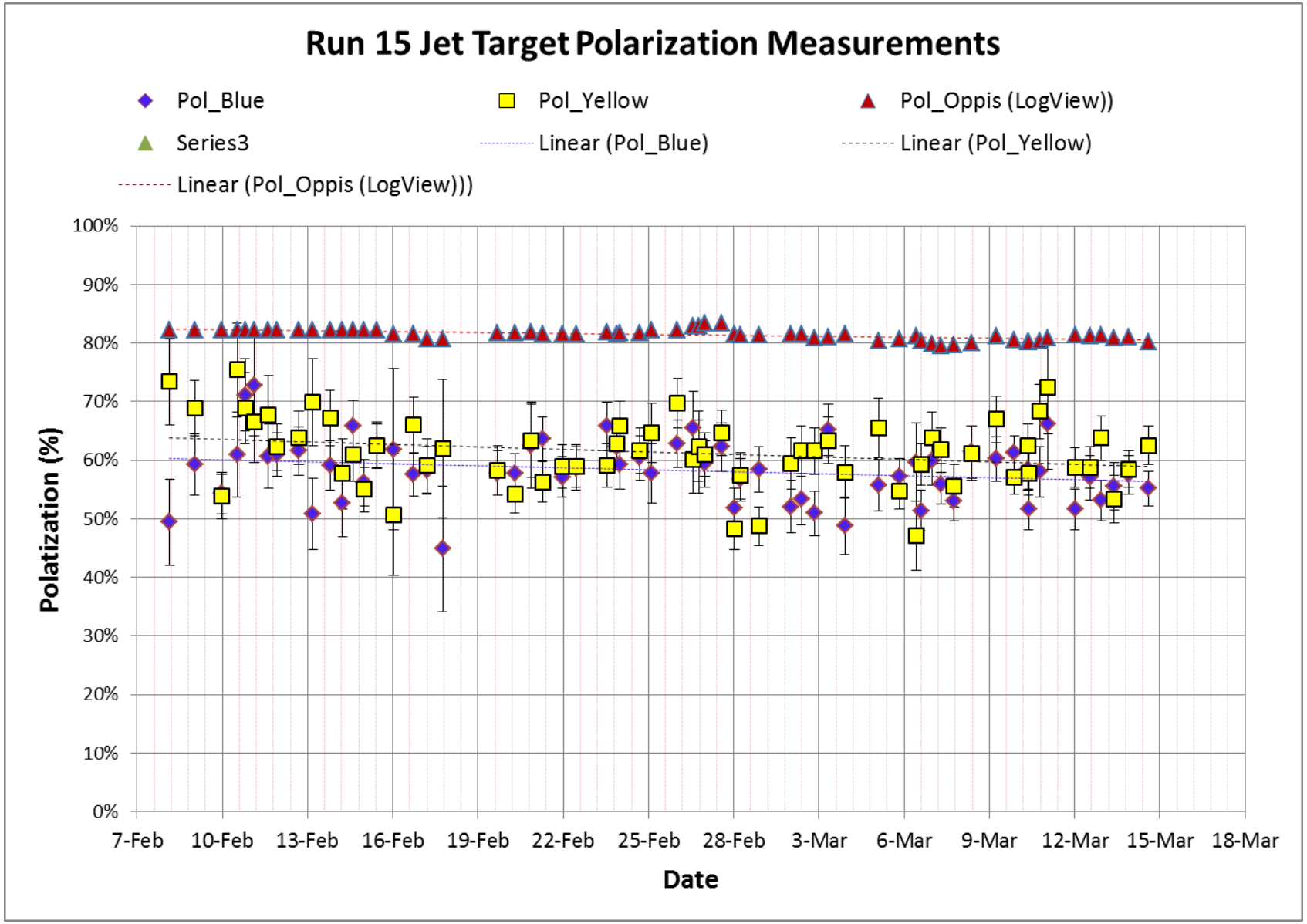
Thru fill 18780, 14 Mar



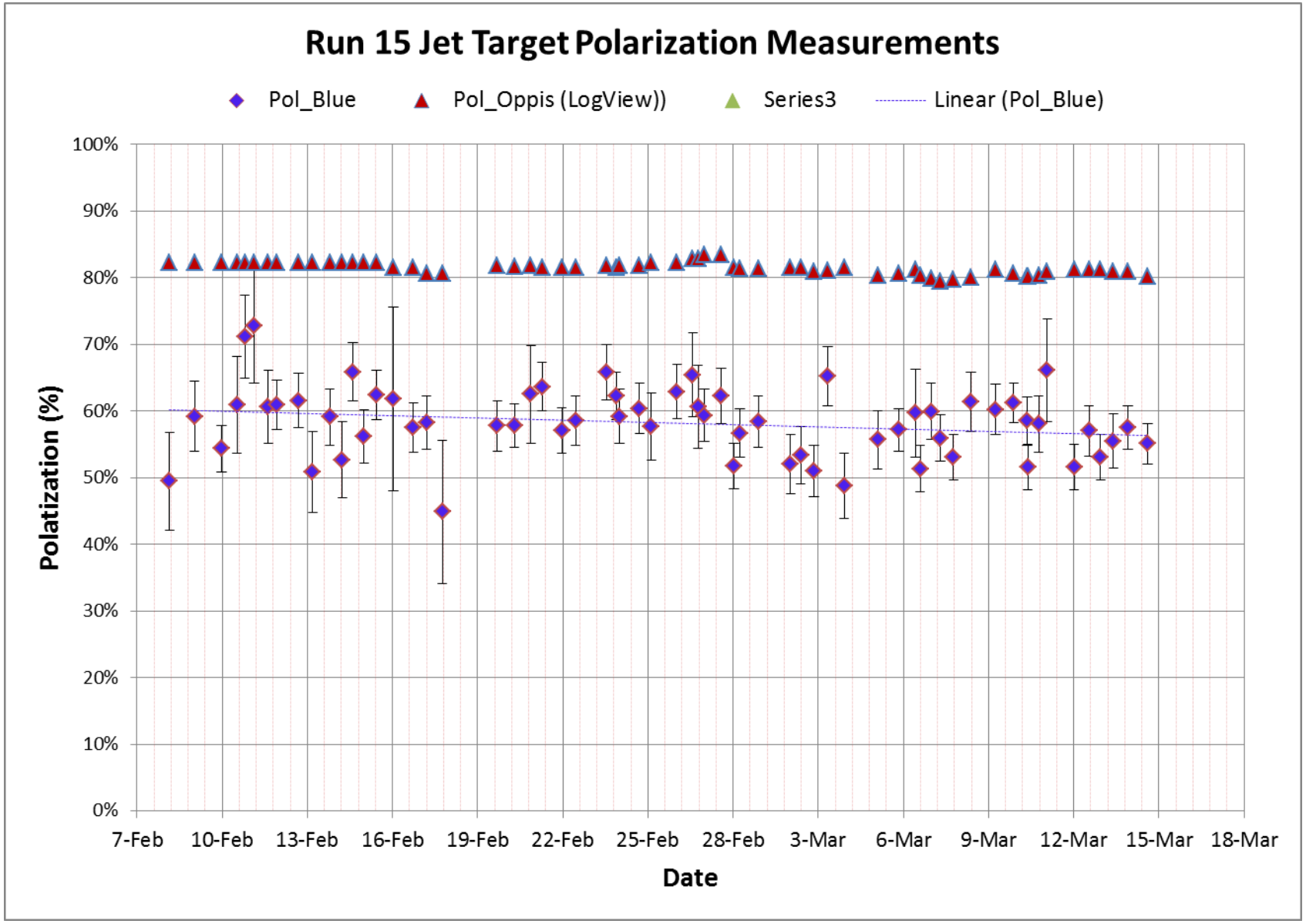
Thru fill 18780, 14 Mar



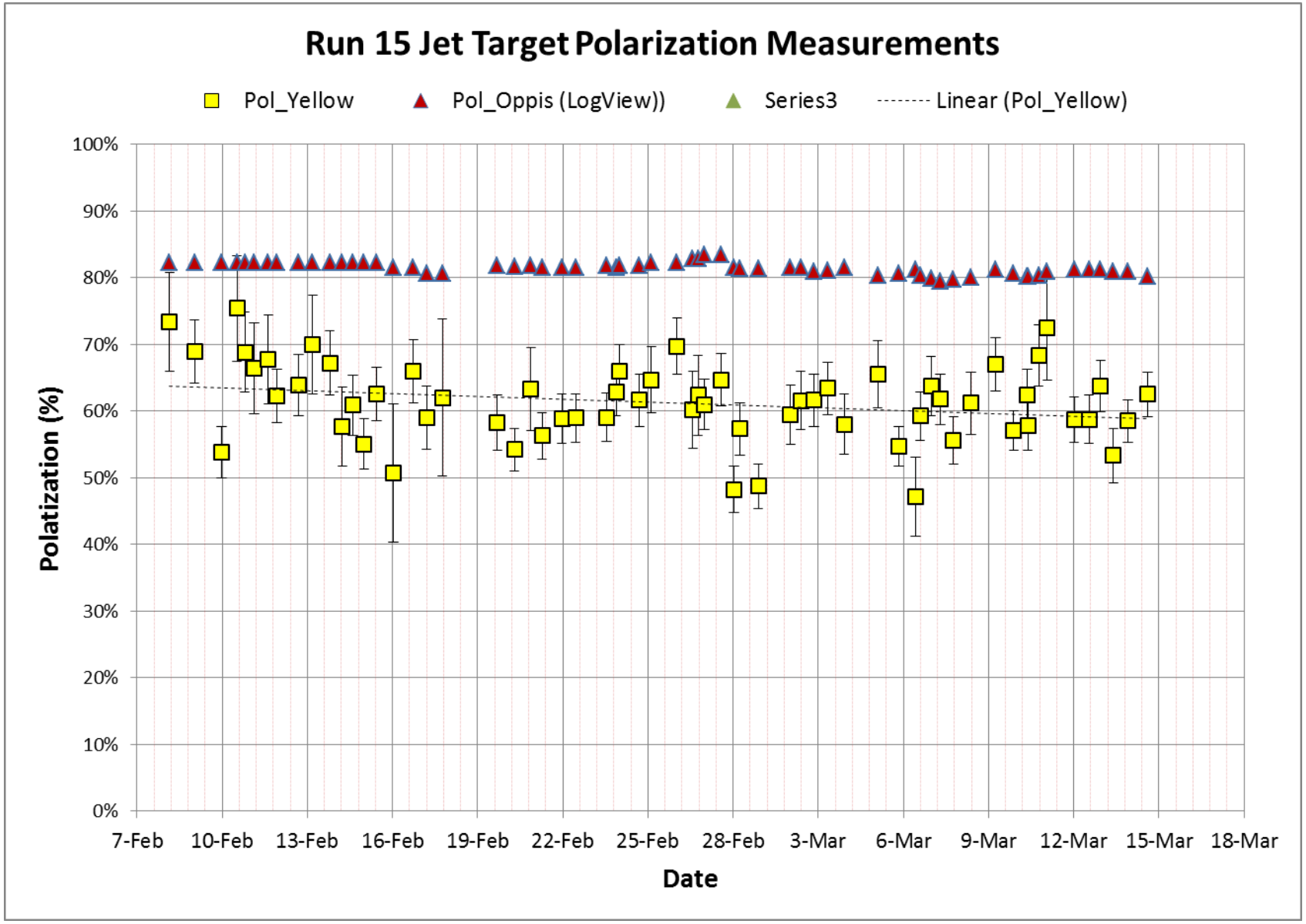
Av Polarization: Blue = 57.2 ± 0.5%; Yellow = 59.4 ± 0.5% (goal ≥60%)



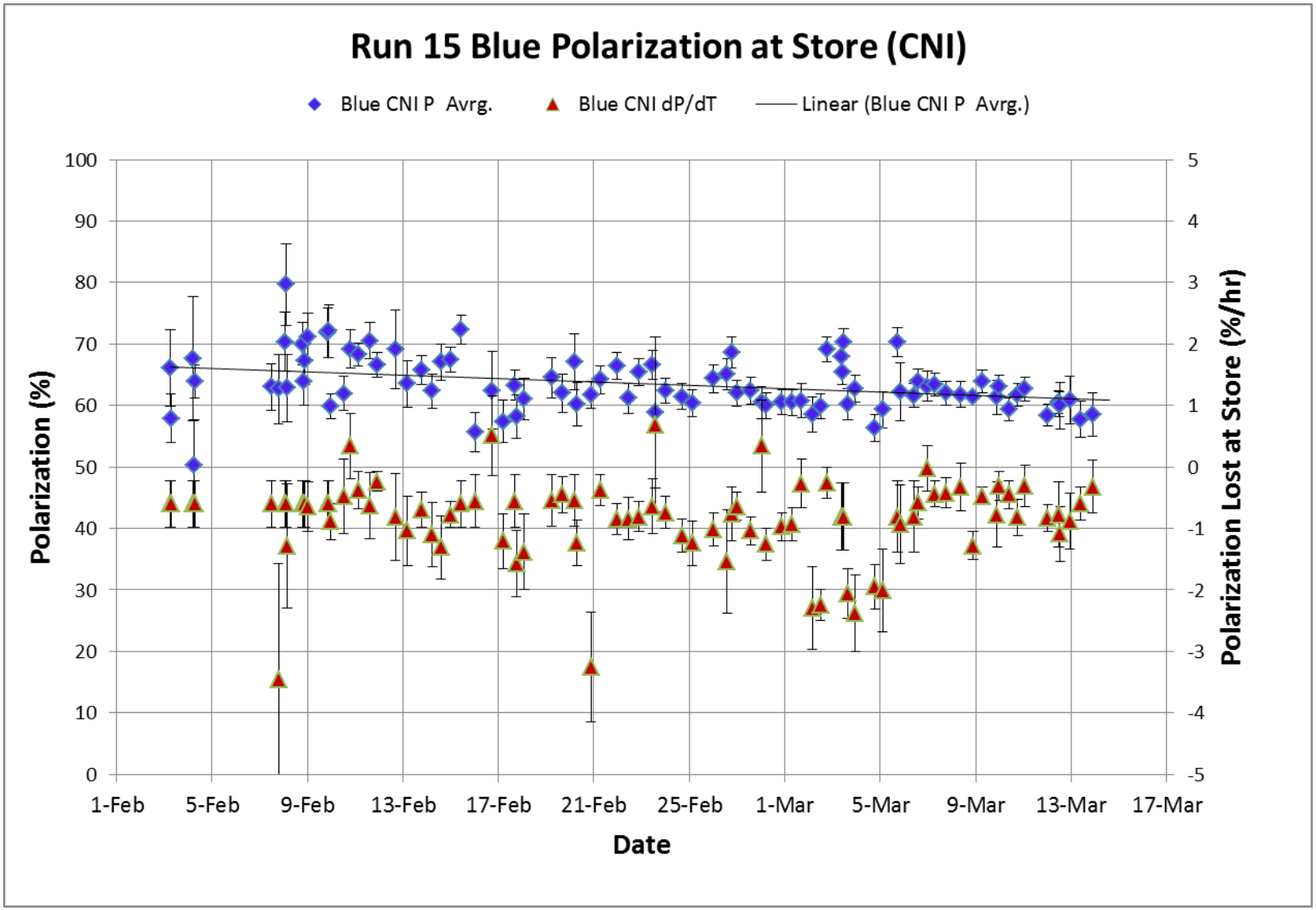
through fill 18780, 3/14/15



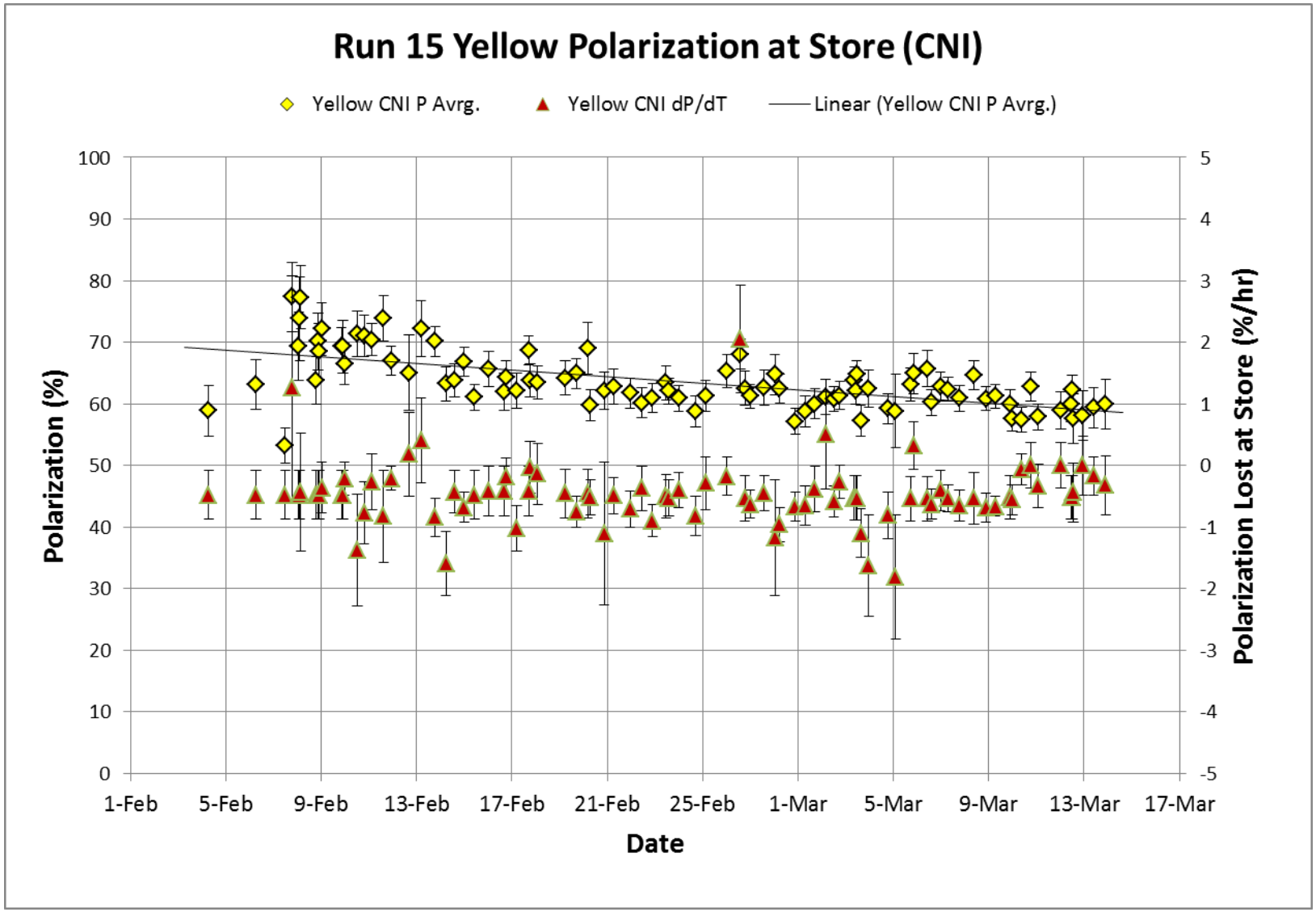
through fill 18780, 3/14/15



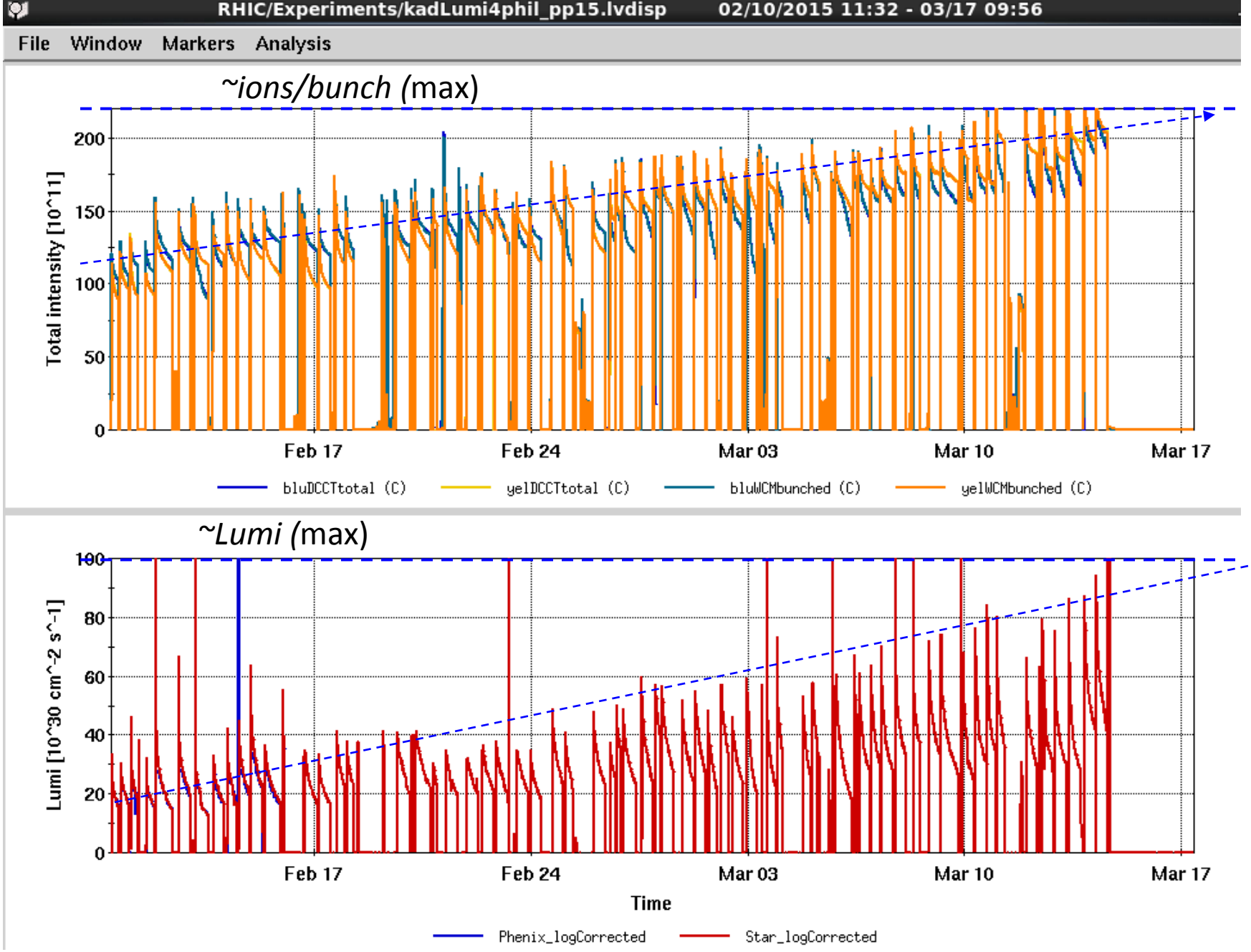
through fill 18780, 3/14/15



through fill 18779, 3/13/15

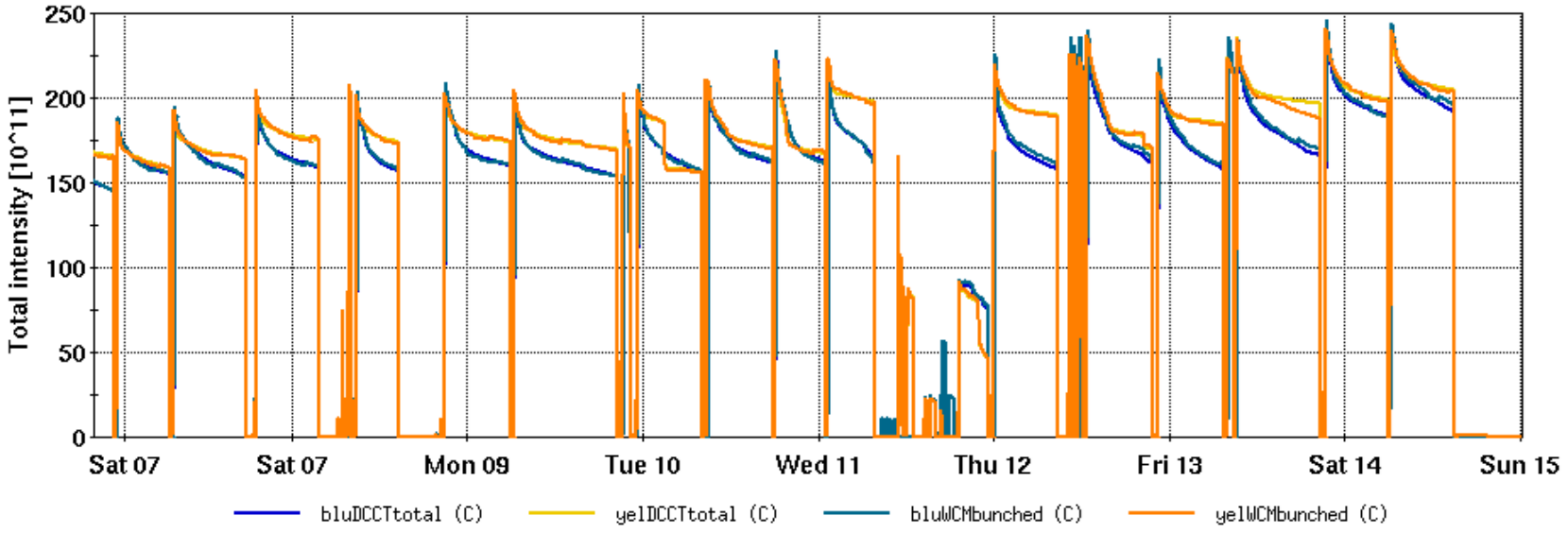


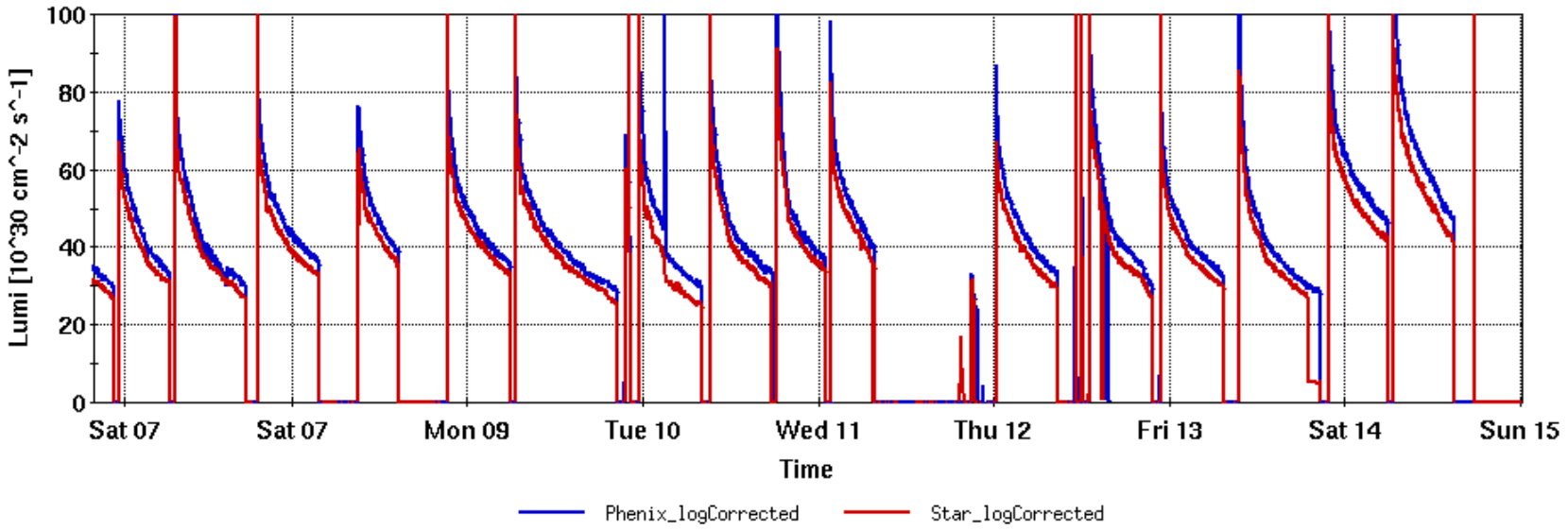
through fill 18779, 3/13/15


RHIC/Experiments/kadLumi4phil_pp15.lvdisp 02/10/2015 11:32 - 03/17 09:56
File Window Markers Analysis
~ions/bunch (max)
Total intensity [10^11]
200
150
100
50
0
Feb 17
Feb 24
Mar 03
Mar 10
Mar 17
bluDCCTtotal (C)
yelDCCTtotal (C)
bluWCMbunched (C)
yelWCMbunched (C)
~Lumi (max)
Lumi [10^30 cm^-2 s^-1]
100
80
60
40
20
0
Feb 17
Feb 24
Mar 03
Mar 10
Mar 17
Time
Phenix_logCorrected
Star_logCorrected

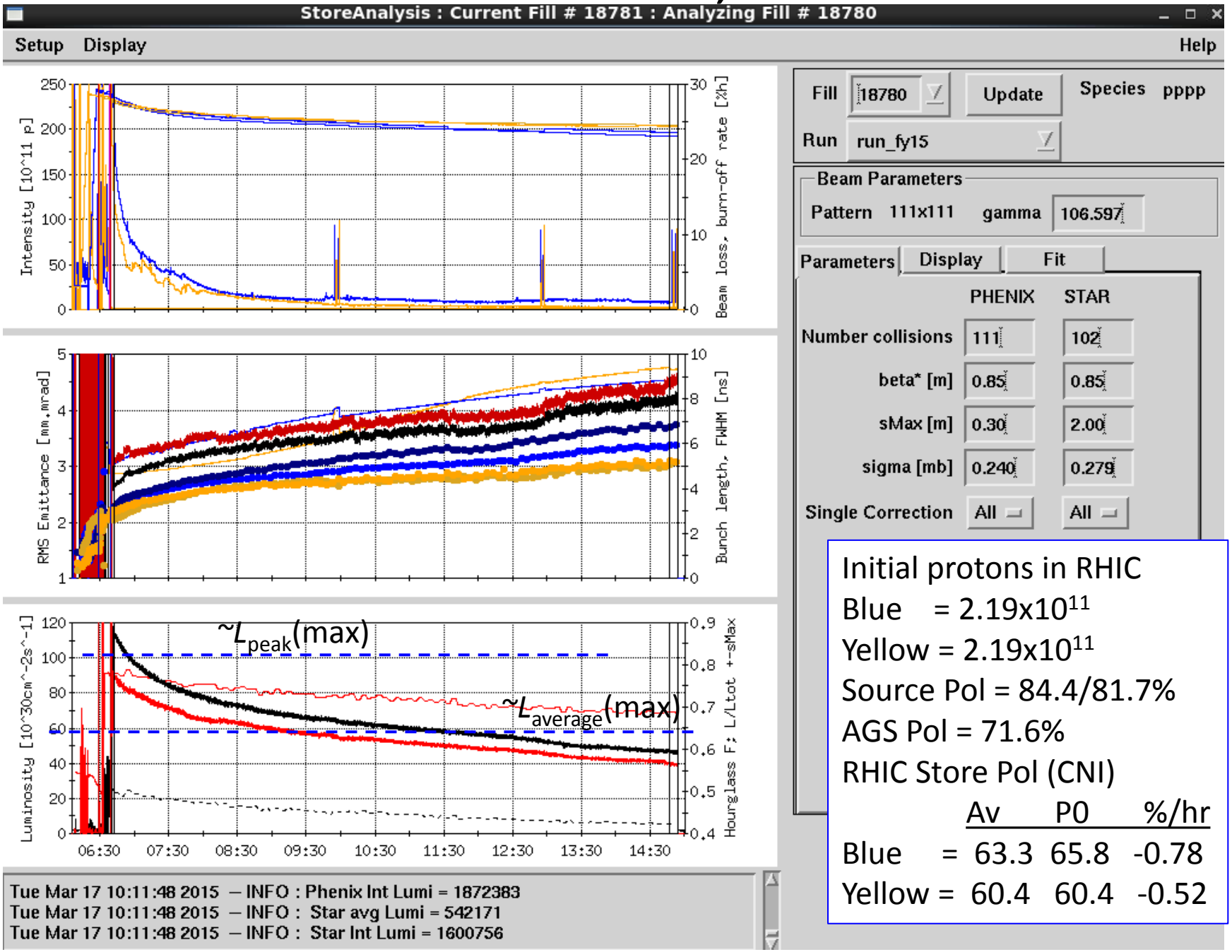
RHIC/Experiments/kadLumi4phil_pp15.lvdisp 03/06/2015 19:55 - 03/15 00:12

File Window Markers Analysis





~Best Store to Date – 18780, Sat 14 Mar



Initial protons in RHIC

Blue = 2.19×10^{11}

Yellow = 2.19×10^{11}

Source Pol = 84.4/81.7%

AGS Pol = 71.6%

RHIC Store Pol (CNI)

	Av	P0	%/hr
Blue =	63.3	65.8	-0.78
Yellow =	60.4	60.4	-0.52

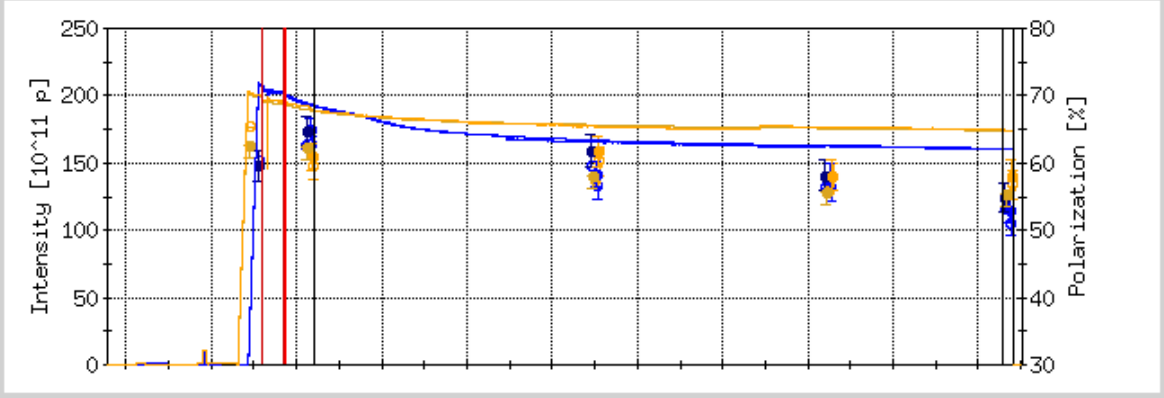
Archive

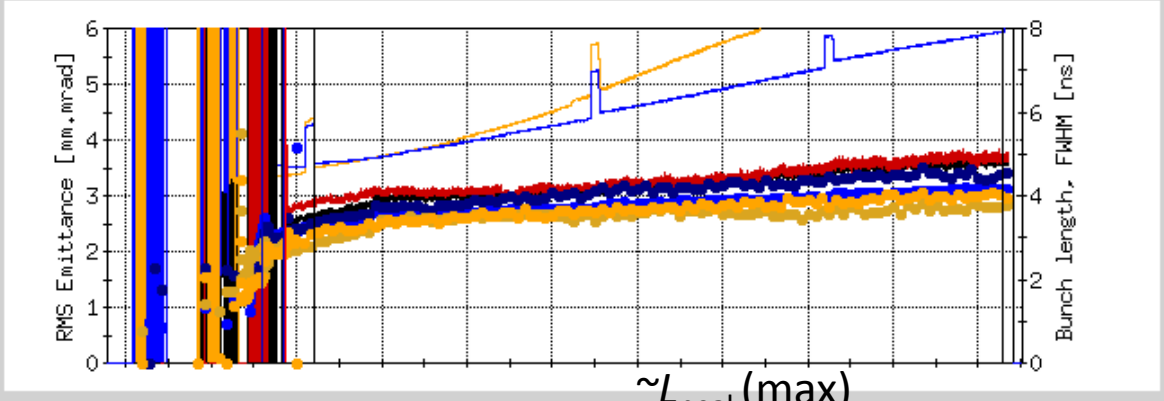
StoreAnalysis : Current Fill # 18761 : Analyzing Fill # 18760

Setup Display

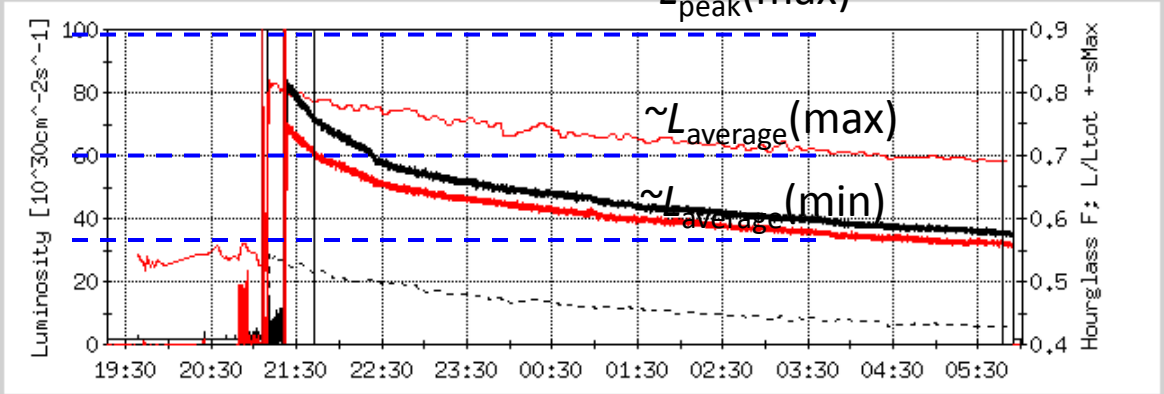
~Previous Best Store to Date – 18761, Mon 9 Mar

He





$\sim L_{peak}$(max)



$\sim L_{average}$(max)

$\sim L_{average}$(min)

Fill 18760 Update Species pppp

Run run_fy15

Beam Parameters

Pattern 112x118 gamma 106.597

Parameters | Display | Fit

	PHENIX	STAR
Number collisions	111	102
beta* [m]	0.85	0.85
sMax [m]	0.30	2.00
sigma [mb]	0.240	0.279
Single Correction	All	All

Initial protons in RHIC

Blue = 1.82×10^{11}

Yellow = 1.84×10^{11}

Source Pol = 81.5/81.5%

AGS Pol = 68.4%

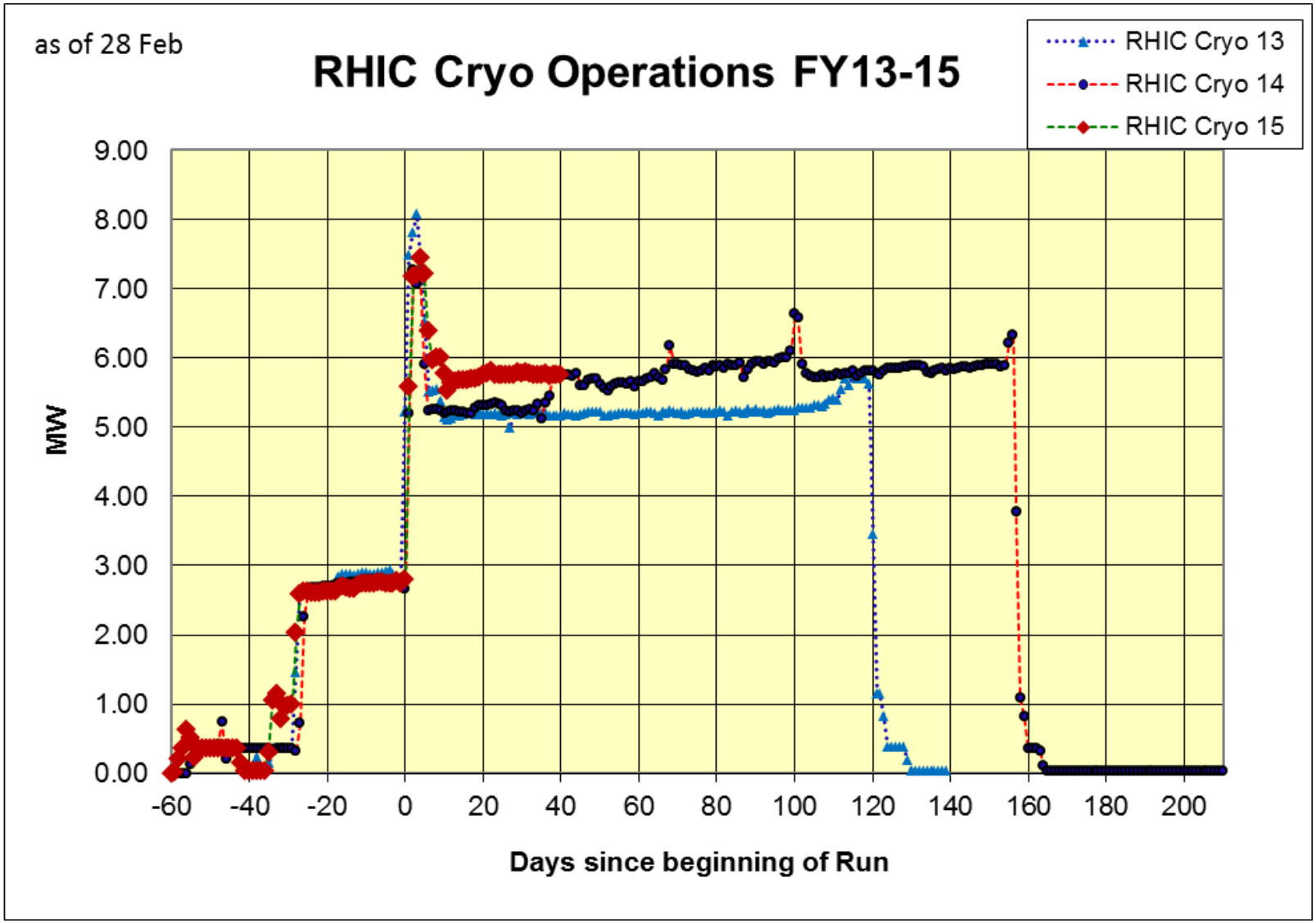
RHIC Store Pol (CNI)

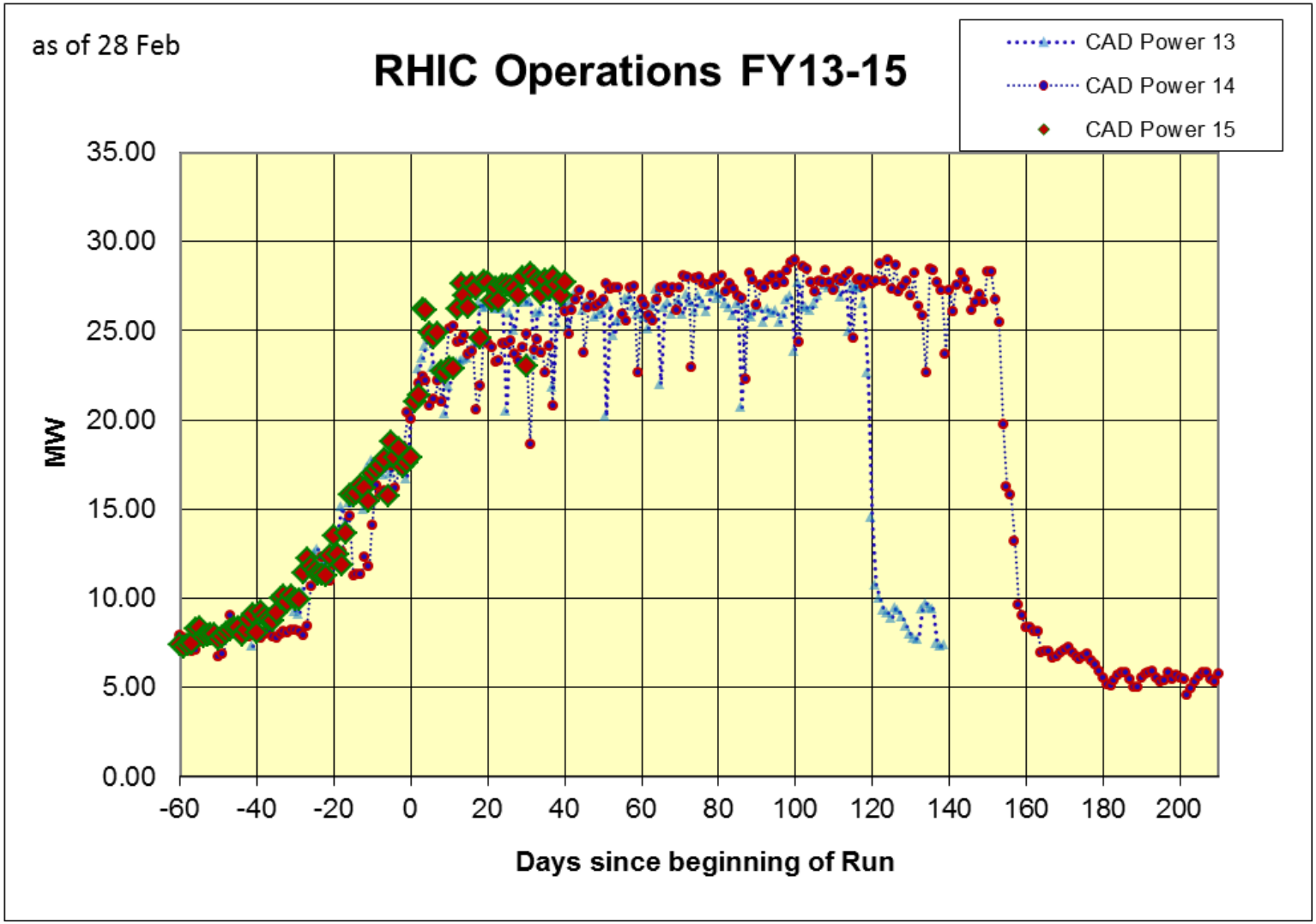
	Av	P0	%/hr
Blue	=		
Yellow	=		

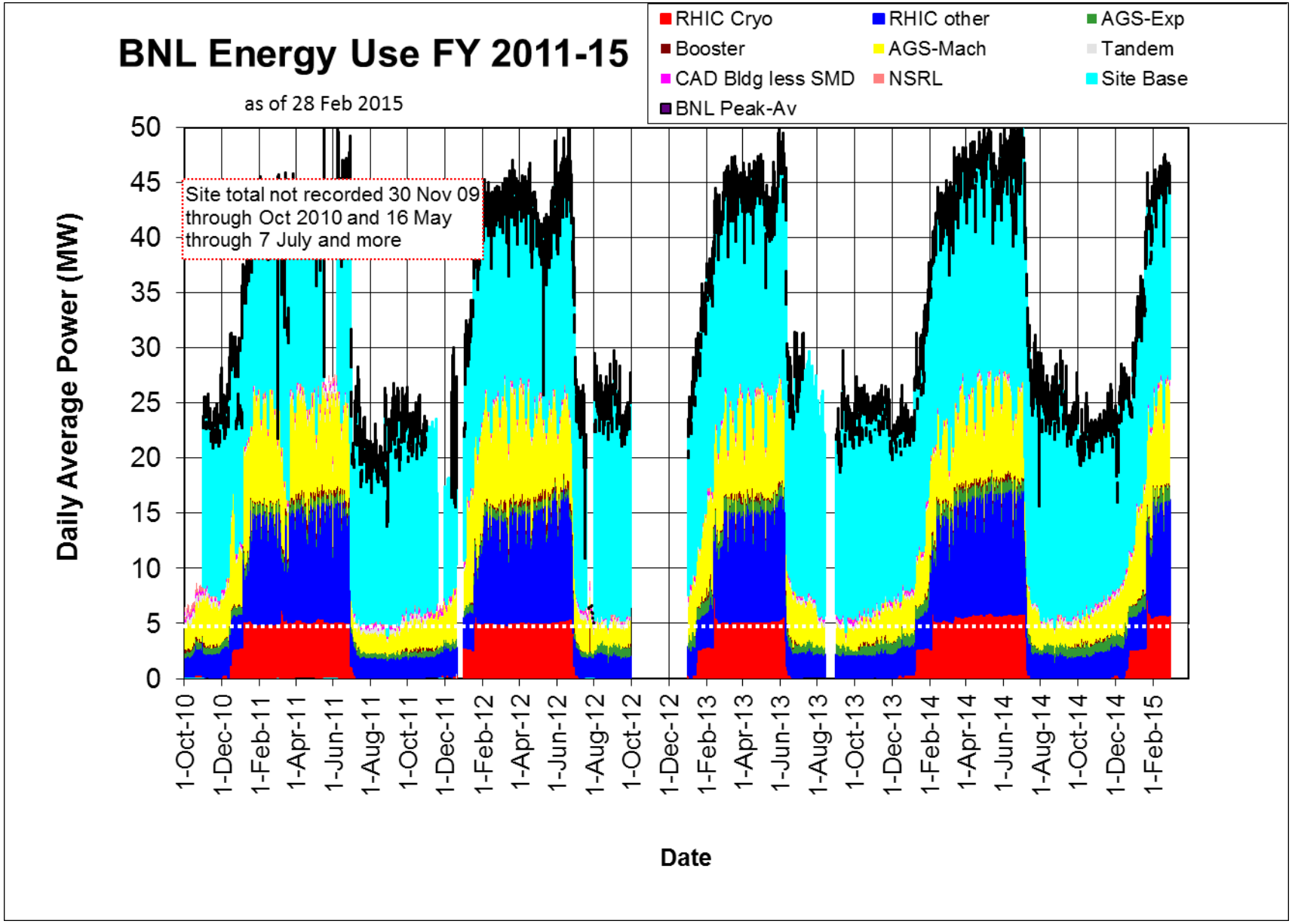
Mon Mar 9 11:01:00 2015 – INFO : Phenix avg Lumi = 453608

Mon Mar 9 11:01:00 2015 – INFO : Phenix Int Lumi = 1339561

Mon Mar 9 11:01:00 2015 – INFO : Star avg Lumi = 404874

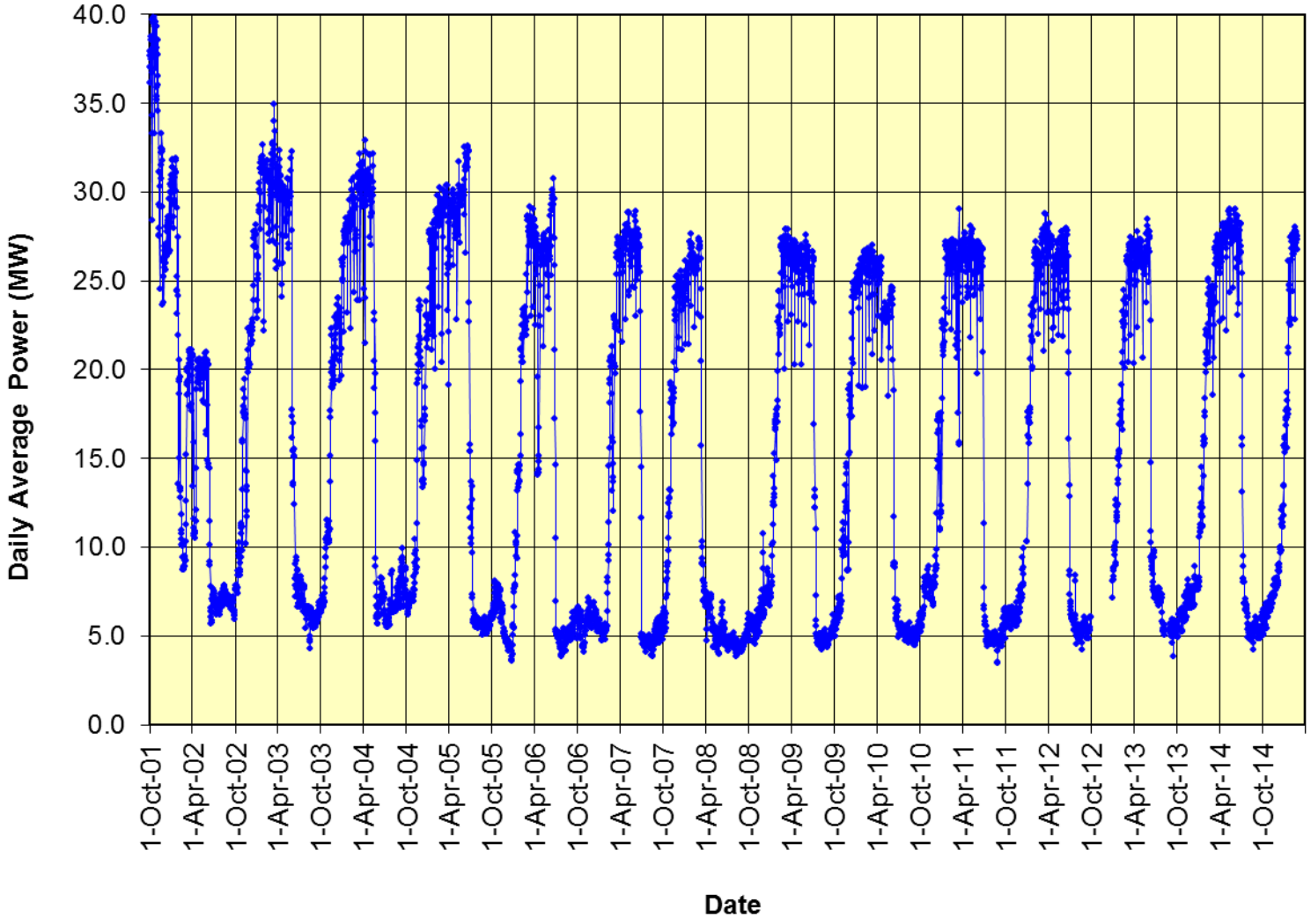

as of 28 Feb
RHIC Cryo Operations FY13-15
RHIC Cryo 13
RHIC Cryo 14
RHIC Cryo 15
MW
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-60
-40
-20
0
20
40
60
80
100
120
140
160
180
200
Days since beginning of Run

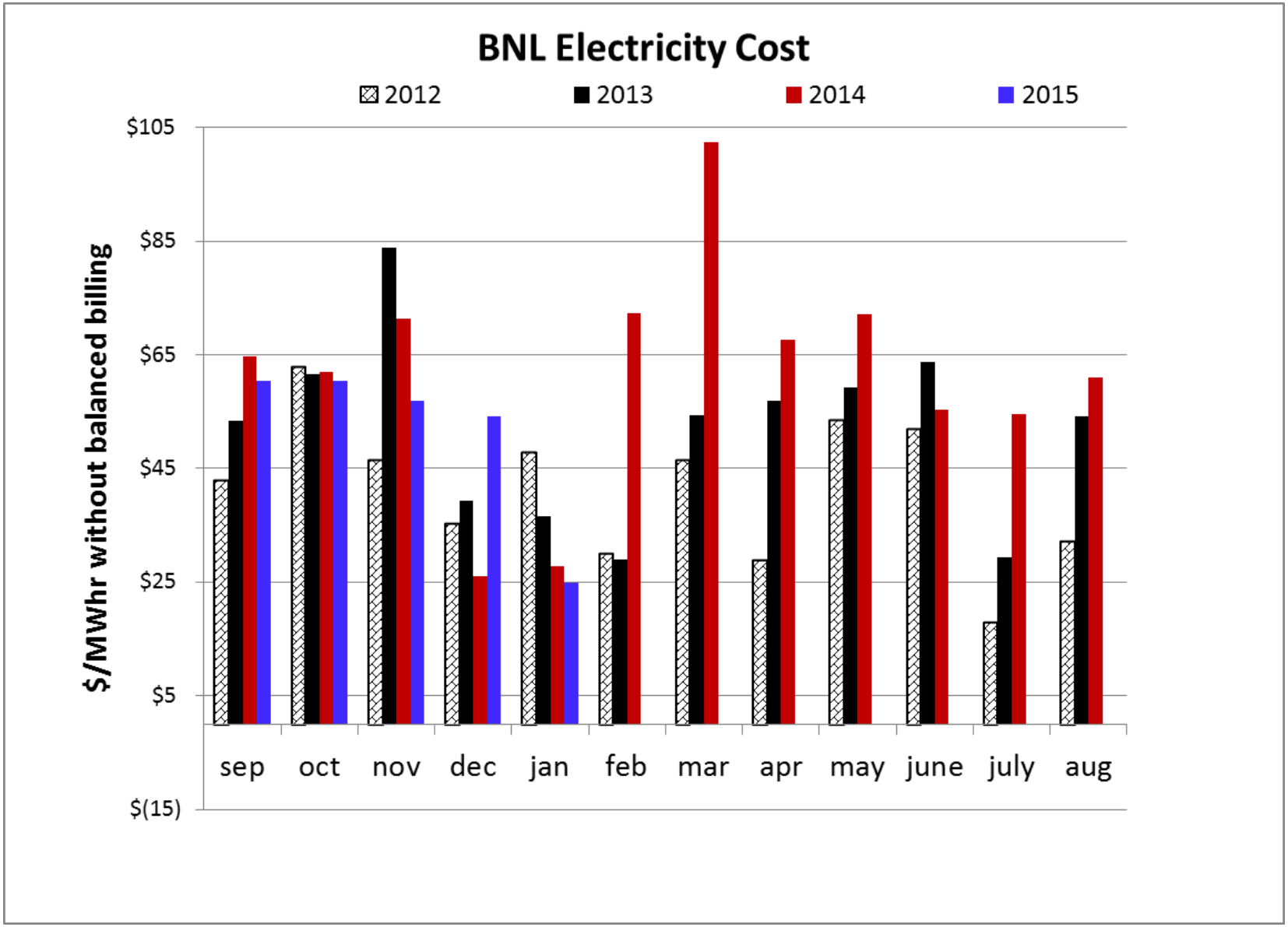

as of 28 Feb
RHIC Operations FY13-15
CAD Power 13
CAD Power 14
CAD Power 15
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
MW
-60
-40
-20
0
20
40
60
80
100
120
140
160
180
200
Days since beginning of Run


BNL Energy Use FY 2011-15
as of 28 Feb 2015
RHIC Cryo
RHIC other
AGS-Exp
Booster
AGS-Mach
Tandem
CAD Bldg less SMD
NSRL
Site Base
BNL Peak-Av
Site total not recorded 30 Nov 09 through Oct 2010 and 16 May through 7 July and more
Daily Average Power (MW)
0
5
10
15
20
25
30
35
40
45
50
1-Oct-10
1-Dec-10
1-Feb-11
1-Apr-11
1-Jun-11
1-Aug-11
1-Oct-11
1-Dec-11
1-Feb-12
1-Apr-12
1-Jun-12
1-Aug-12
1-Oct-12
1-Dec-12
1-Feb-13
1-Apr-13
1-Jun-13
1-Aug-13
1-Oct-13
1-Dec-13
1-Feb-14
1-Apr-14
1-Jun-14
1-Aug-14
1-Oct-14
1-Dec-14
1-Feb-15
Date

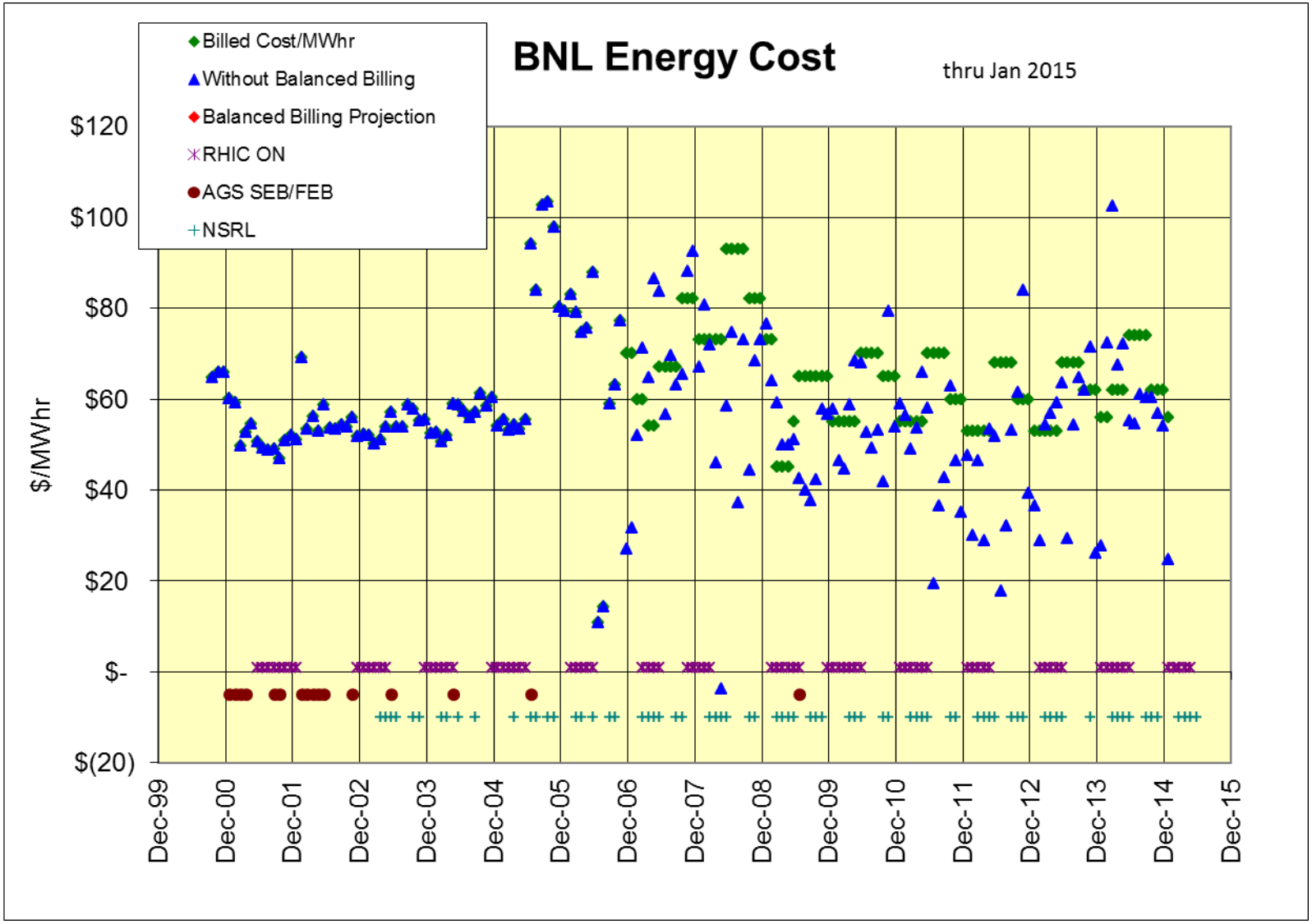
as of 28 Feb 2015

C-AD Energy Use FY 2002-15

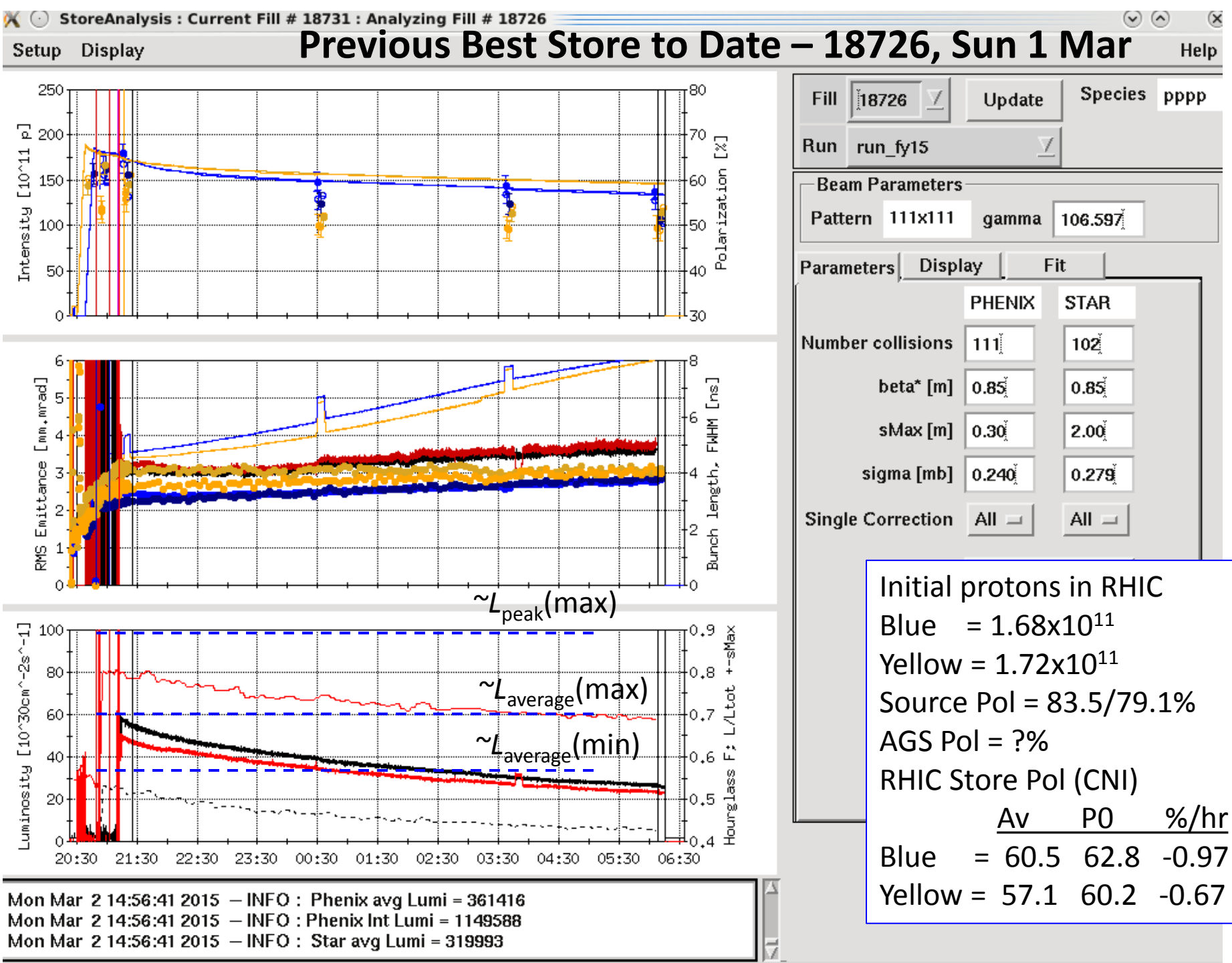



BNL Electricity Cost
2012
2013
2014
2015
$/MWhr without balanced billing
$105
$85
$65
$45
$25
$5
$(15)
sep
oct
nov
dec
jan
feb
mar
apr
may
june
july
aug

Balanced Billing for the lab - +1,305K through Jan 2015



Previous Best Store to Date – 18726, Sun 1 Mar



Initial protons in RHIC

Blue = 1.68×10^{11}

Yellow = 1.72×10^{11}

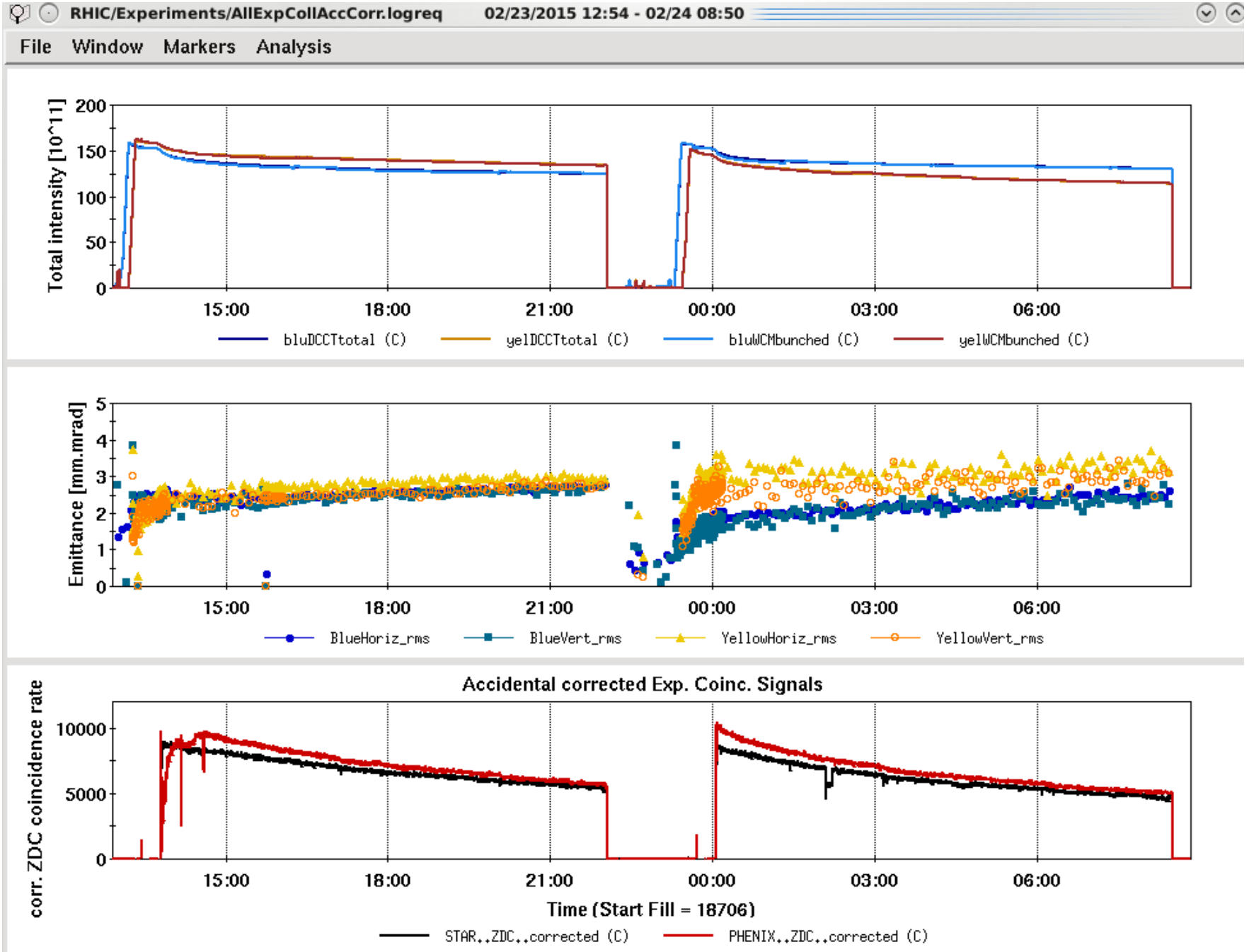
Source Pol = 83.5/79.1%

AGS Pol = ?%

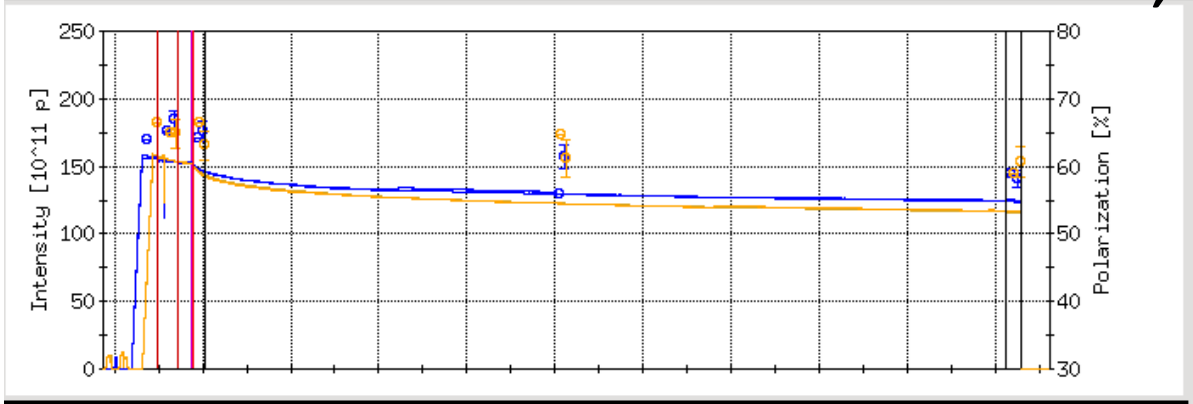
RHIC Store Pol (CNI)

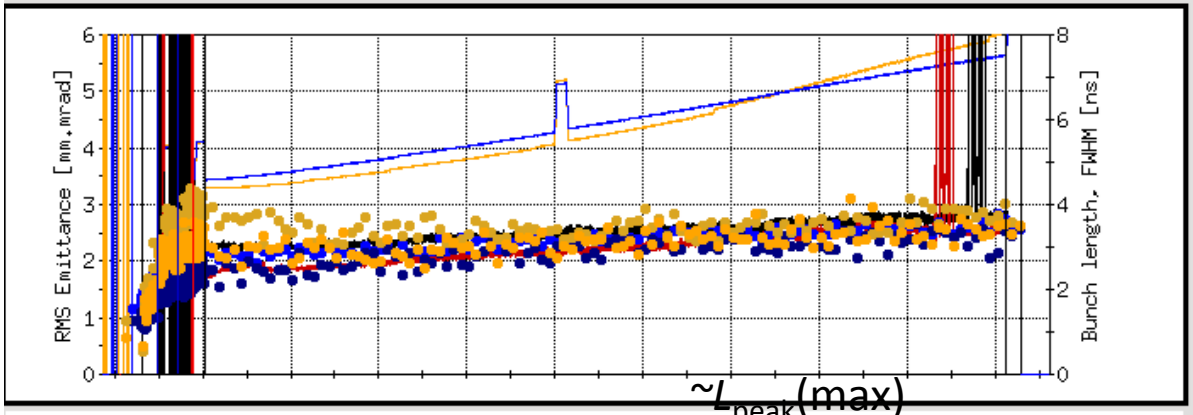
	Av	P0	%/hr
Blue =	60.5	62.8	-0.97
Yellow =	57.1	60.2	-0.67

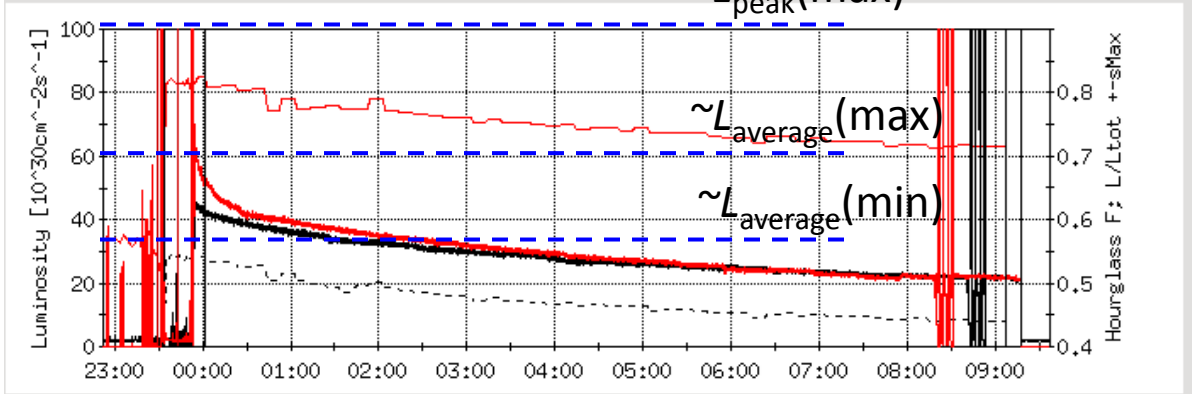
23 Feb stores 18706 & 18707



Previous Best Store – 18676, Sat 14 Feb







Tue Feb 17 12:10:13 2015 – INFO : Phenix avg Lumi = 274750
Tue Feb 17 12:10:13 2015 – INFO : Phenix Int Lumi = 917098
Tue Feb 17 12:10:13 2015 – INFO : Star avg Lumi = 288131

Fill 18676 Update Species pppp
Run run_fy15

Beam Parameters
Pattern 118x129 gamma 106.597

Parameters | Display | Fit

	PHENIX	STAR
Number collisions	111	102
beta* [m]	0.85	0.85
sMax [m]	0.30	2.00
sigma [mb]	0.240	0.279
Single Correction	All	All

Update Display

Source Pol = 81.8/81.9%
AGS Pol = 73.7%
RHIC Store Pol

	Av	P0	%/hr
Yellow =	66.8	70.2	-0.68
Blue =	67.4	68.7	-0.78

PHENIX goals 9 weeks, 50pb-1 recorded within 40 cm vertex with 60% pol
STAR goals 12 weeks, 90 pb-1 recorded and 500M MB events, 60 % pol

Estimate of required lumi (based on Run 12 efficiencies):
STAR = 90/0.6 = 150 pb-1
PHENIX = 50/0.35 = 140 pb-1

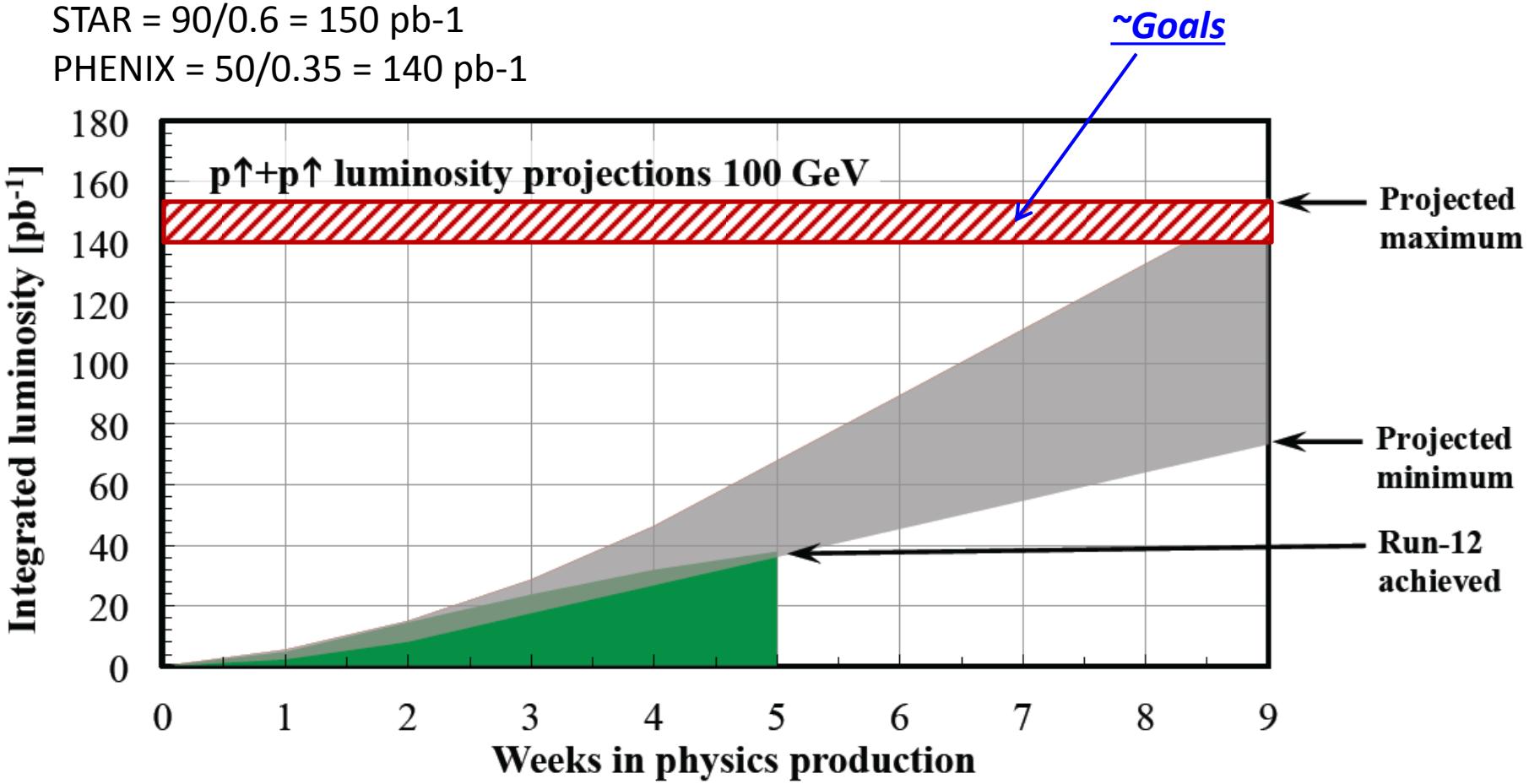


Figure 3: Projected minimum and maximum integrated luminosities for polarized proton collisions at 100 GeV beam energy, assuming linear weekly luminosity ramp-up in 5 weeks. An average store polarization between 59% and up to 63% is expected.

http://www.bnl.gov/cad/esfd

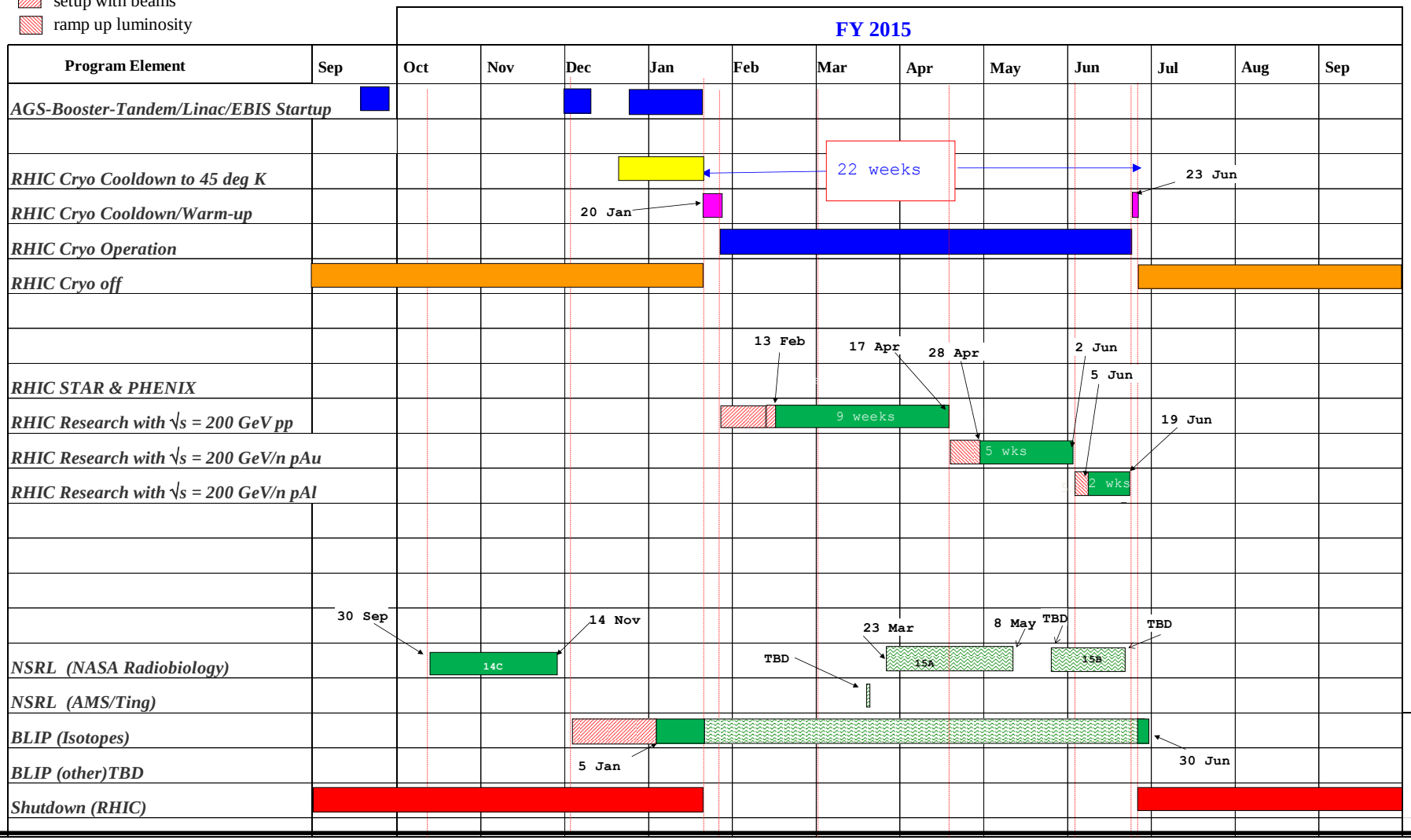
Scheduling Physicist: Makdisi/Pile

C-A Operations-FY15

8 Jan 15

Plan, subject to change

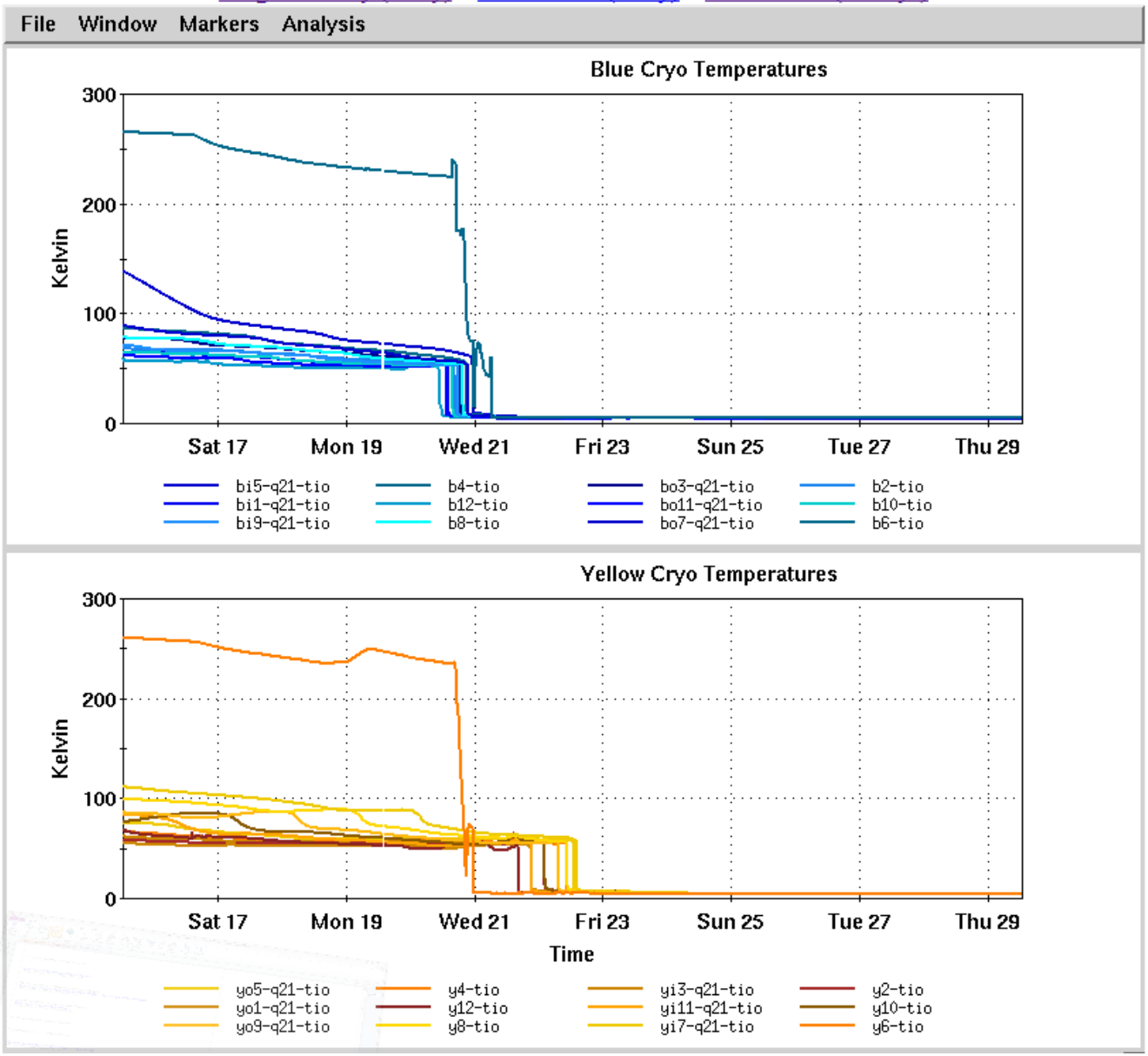
concurrent with RHIC
setup with beams
ramp up luminosity



Cryogenic Blue & Yellow Rings (14 days)

Ring Summary (1 day) Sector Plots (1 day) Sector Plots (14 days)

File Window Markers Analysis



ePHENIX Update!

symmetry dimensions of particle physics

A joint Fermilab/SLAC publication

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Photo by Andy Freeberg, SLAC National Accelerator Laboratory

breaking

January 16, 2015

20-ton magnet heads to New York

A superconducting magnet begins its journey from SLAC laboratory in California to Brookhaven Lab in New York.

By Justin Eure

PDF download

Imagine an MRI magnet with a central chamber spanning some 9 feet—massive enough to accommodate a standing African elephant. Physicists at the US Department of Energy's Brookhaven National Laboratory need just such an extraordinary piece of equipment for an upcoming experiment. And, as luck would have it, physicists at SLAC

most popular

January 16, 2015
20-ton magnet heads to New York
A superconducting magnet begins its journey from SLAC laboratory in California to Brookhaven Lab in New York.

January 13, 2015
Dark horse of the dark matter hunt
Dark matter might be made up of a type of particle not many scientists are looking for: the axion.

January 12, 2015
Mirror, mirror
After more than six years of grinding and polishing, the first-ever dual-surface mirror for a major telescope is complete.

symmetry tweets

January 19, 2015
ICYMI: Accelerator-driven carbon dating advances everything from archaeology to medicine: http://t.co/hqMcZnCCw4

Who's Who for 2015

RHIC 100 x 100 GeV polarized protons:
Run Coordinator: Vincent Schoefer, schoefer@bnl.gov , 631-344-8453 (office)

RHIC 100 x 100 GeV/n polarized protons on gold and polarized protons on aluminum:
Run Coordinator: Chuyu Liu, cliu1@bnl.gov , 631-344-4431 (office)

Scheduling Physicists:
Yousef Makdisi, makdisi@bnl.gov, 631-344-4932(office) 631-??
Phil Pile, pile@bnl.gov, 631-344-4643 (office), 631-834-2005 (cell)

AGS Liaison:
Haixin Huang, huanghai@bnl.gov , 631-344-5446 (office)

The Plan for Run 15: 22 weeks of cryo operations

Cool-down from 50 K to 4 K	0.5 weeks	
Set-up mode 1 (p↑+p↑ at 100 GeV)	2.5 weeks	(no dedicated time for experiments)
Ramp-up mode 1	0.5 weeks	(8 h/night for experiments)
Data taking mode 1	9 weeks	
Set-up mode 2 (p↑+Au at 100 GeV/nucleon)	1.5 weeks	(no dedicated time for experiments)
Data taking mode 2 with further ramp-up	5 weeks	
Set-up mode 3 (p↑+Al at 100 GeV/nucleon)	0.5 weeks	(no dedicated time for experiments)
Data taking mode 3+1 with further ramp-up	2 weeks	
Warm-up	0.5 week	

From Fischer et. al., RHIC Collider Projections (FY 2014 – FY 2022), 21 Sep 2014